REMARKS/ARGUMENTS

Rejections under 35 U.S.C. § 102

§ 102 Rejections based on U.S. Patent 5,448,206 ("Newhall")

Claims 1, 21, 22, 24-31, 33, 34, 39, 40, 43, 44 stand rejected as allegedly anticipated by U.S. Patent No. 5,448,206 issued to Newhall (thereafter "Newhall"). See Page 2 of the Office Action. Claim 1 was cancelled without prejudice or disclaimer.

Claim 21, 22, 25 (and all claims depending therefrom)

In order for a reference to anticipate a claim, the reference must disclose each and every limitation of the claimed invention, either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation. See Atlas Powder Co. v. Ireco Inc., 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999); In re Paulsen, 30 F.3d 1475, 1479, 31 USPQ2d 1671, 1673 (Fed. Cir. 1994). Independent Claim 21 [emphasis added] recites, inter alia, "[a] method for encoding carrier signal independent data to a content signal ... using z-transforms to identify **non-deterministic** components of said content signal; and encoding carrier signal independent data into said identified **non-deterministic** components of said content signal to create a digital sample stream." The 102 rejection based on Newhall is improper for at least the reason that Newhall fails to disclose "carrier signal independent data" or, more particularly, the step of "encoding carrier signal independent data into said identified non-deterministic components of said content signal."

The Examiner asserts that "... Newhall discloses a method for embedding recoverable sample data into an input signal wherein an input signal is modulated using composing functions (linear predictive coding) that include a Z transform." Office Action at 2. Newhall teaches "[a] system is described which achieves an increased rate of transmission by transmitting multiple symbols in one symbol time. The information in the overlapping symbols can be recovered if the symbol used for transmission is chosen so that a subset of the samples representing the symbol has an inverse" Newhall at Abstract. Newhall does not teach using Z-transforms to identify non-deterministic components of the content signal and then encodeing carrier signal independent data into those identified locations. Improving transmission between senders and receivers is antithetical to hiding "carrier signal independent data", such as a "digital watermark", from unauthorized parties. Transmissions of the type described by Newhall are arguably designed to enable senders and receivers to improve real time communications by methods such as "equalization", "predistorting", or sharing associated "filters" -- with emphasis on deterministic signal characteristics that "[have] an inverse," Newhall at Abstract. Additional support: see Newhall at Col. 3 ll. 6-10 where the Z transform makes the "... inverse filter absolutely convergent."; Col. 3 ll. 55-65 "[t]hese **FIR sample sequences have been given the name composing functions.**" [emphasis added]; Col. 3 ll. 68 – Col. 4 ll. 1-10; Col. 5 ll. 8-15

"[p]redistortion equalization by itself can significantly increase the information rate transmitted."; and, Col. 8 ll. 31-42.

Examiner further asserts "[o]nce the signal is run through composing functions data samples (carrier signal independent data, watermark) are embedded into the signal based on the results of the composing functions (Figs. 1A, 1B) (Col. 8, line 45 – Col. 9, line 6)" Office Action at Page 2. However, Applicants' claims are directed to digital watermarking in non-deterministic components of the signal to make recovery of the independent data more computationally difficult for the receiver or unauthorized party. As a means of copyright protection, embedding "carrier signal independent data", as disclosed by Applicants', is directed such that the sample stream has little or no change in the perceptibility in the then "watermarked" sample stream. Further, Newhall's invention is directed at signal dependent "embedded samples, teaching away from the Applicants' invention and claim limitations. In fact, Newhall's "embedded samples" work when the carrier is "predistorted", which teaches away from the Applicants' claimed invention of watermarking a signal with "carrier signal independent data" so as to have minimal impact on said signal's quality: Newhall, however, apparently requires multiple signals for recovery including at least the "I and Q baseband signals." "In summary in this embodiment an increase in the bit rate of Standard Digital Cellular has been achieved by transmitting overlapping composing functions, the composing functions having embedded samples. The inverse of these embedded samples is the inverse filter. Decoding is accomplished by locating the embedded samples in the received I and Q baseband signals and passing the embedded samples through the inverse filter" in Newhall at Col. 19 ll. 62 - Col. 20 ll. 2. Applicants' do not rely on "locating the embedded samples" for decoding the carrier signal – the Applicants' carrier signal is perceptually the same after watermarking. Further, Newhall's term "embedded samples" appears to signify what the inverse filter "is" as per and is fully signal dependent being a subset of the transmitting signals, not "carrier signal independent data" located in "non-deterministic components" or carrier signal characteristics. Last, that at least two (2) input signals are required to practice Newhall, namely the I and Q baseband signals, teaches away from the Applicants' invention, Newhall at Col. 7 ll. 35-62 "[w]hen the **embedded samples associated with a scaled value of the composing function are passed through this inverse a single pulse is generated whose amplitude is dependent on the scaling factor applied to the composing function**." [emphasis added]; Figure 12; Figure 23; Figure 24C and 24D; and, Col. 19 ll. 62 – Col. 20 ll.

Because Newhall requires "composing functions" to "increase[e] rate of transmission by transmitting multiple symbols in one symbol time" Newhall at Abstract, emphasis is apparently placed on finding deterministic measurements, which as per Newhall Col. 19 ll. 62 – Col. 20 ll. 2, can be represented as "embedded samples." Newhall thereby teaches away from Applicants' digital watermarking invention—which is directed at non-deterministic signal measurements, components, or locations making the embedded data difficult to find. As per the Applicants' teachings, non-deterministic signal measurements, components, or locations are ideal in forcing signal damage when unauthorized attempts at erasure of the embedded independent data, or digital watermark, are made. Newhall's description, moreover, is at odds with the Examiner's assertions, especially at Col. 30 ll. 4-

14: "The composing functions required are established in a deterministic manner from channel measurements. This type of equalization has been termed full predistortion equalization. Alternatively a portion or all of the channel equalization can be done at the receiver. Any residual distortion in the signals arriving at the receiver can be removed by finding the filtering required to map distorted composing functions into undistorted composing functions and applying the same filtering to the received distorted signals." Newhall teaches that "... in addition they can be applied to passband channels which do not use embedded sample transmission" Newhall at Col. 20 ll. 20-22. Assuming arguendo that Newhall's "embedded samples" are similar to "carrier signal independent data" or "digital watermark", as per the Examiner's asserted definition, Newhall's teaches instances where "embedded samples" are not used.

Finally, Newhall clearly teaches multiple signal streams at the receiver side -- a clearly different invention than the Applicants' in summarizing at Col. 20 ll. 26-30: "[t]he interaction of multiple waves arriving at the receiver is analyzed and novel methods proposed to remove the intersymbol interference introduced by the channel". Examiner cites Figures 1A and 1B several times as a basis for rejections. Close inspection of the Figures indicate at 18 "Output Baseband Waveforms"; 19 "Input Baseband Waveforms", which, again, teaches away from the Applicants' invention and claim limitations. Even assuming arguendo that Applicants' "carrier signal independent data, watermark" are "... embedded into the signal based on the results of the composing functions", as I understand the Examiner's asserts on page 2 of the Office Action, Newhall does not disclose that these "embedded samples" remain with the "Recovered Input Data", Newhall at Figure 1B 28. Thus, no "watermarked" signal stream results for later detection by an authorized party, nor can the "embedded samples" be considered "carrier signal independent data" or "digital watermark[s]" as defined by the Applicants' Specification and claims limitations. Newhall does not disclose a digital sample stream such as that taught by Claims 21 and as required by dependent claims 22 and 25. In fact, the "INPUT DATA" of Figure 1A and Figure 1B, are outputted as "RECOVERED INPUT DATA" so as to teach that the input and out is unchanged or AT LEAST not steganographicly encoded with hidden data.

Because Newhall fails to disclose (1) "a method for encoding carrier signal independent data to a content signal"; (2) "using z-transforms to identify non-deterministic components of said content signal"; and (3) "encoding carrier signal independent data into said identified non-deterministic components of said content signal to create a digital sample stream" as required by Claim 21, the Section 102 rejections based on Newhall must be withdrawn. For the same reasons Claim 21 is patentable over Newhall, the claims that depend from Claim 21 are also patentable. Applicants' request the Examiner to withdraw the Section 102 rejections of Claim 21, and dependent claims 22 - 27.

Claim 24

Contrary to the Examiner's assertion that, "Newhall discloses that the signal is passed through an inverse filter during the encoded stages (Col. 7, lines 53-57)" Office Action at 2, the "[c]omposing function is shown to contain a set of embedded samples

whose Z transform has an inverse," Newhall at Col. 7 ll. 50-52, thus "embedded samples" being selected are deterministic to meet Newhall's apparent invention. Applicants' invention is not so limited, in fact, as per Newhall at Col. 8 ll. 45 – Col. 9 ll. 8 (the Examiner also cites this passage), teaches away from the claim limitation of Claim 24, "wherein said step of encoding uses an inverted filter to assist in the encoding carrier signal independent data into said identified non-deterministic components of said content signal." Applicants' argue that the "embedded samples" of Newhall are not "carrier signal independent data" as taught by Applicants' invention. Newhall teaches deterministic filters based on "... a set of embedded samples whose Z transform has an inverse" Newhall at Col. 7 ll. 51-52. Newhall does not teach embedding "carrier signal independent data", such as a "digital watermark", into "non-deterministic components of said content signal." Thus, the inverse filter recited in Claim 14 is not disclosed in Newhall. For these reasons, Claim 24 is patentable over Newhall. Applicants' request that the Examiner withdraw the Section 102 rejection of Claim 24.

Claim 26

Contrary to the Examiner's assertion that, "Newhall discloses that the waveform created by the composing functions is stored in memory (Col. 7, lines 28-32)," there are several "deterministic" factors which are stored including, at least, "baseband modulator", "multilevel generator", "input level", "composing function", etc., Newhall at Col. 7 ll. 20-34, but no mention is made for "non-deterministic components" as required by the Claim limitation, nor is there any apparent indication by Newhall, especially since he apparently teaches improvements in bit rate using deterministic filters based on z-transform calculations, Col. 8 ll. 45 – Col. 9 ll. 6. Essentially, Newhall requires that the z-transform of the embedded samples have an inverse. Newhall, however, does not teach saving "non-deterministic components" to a storage medium as required by Claim 26. For these reasons, Claim 26 is patentable over Newhall. Applicants' request that the Examiner withdraw the Section 102 rejection of Claim 26.

Claim 27

Contrary to the Examiner's assertion that, "Newhall discloses that the composing functions create a waveform that is random in nature (stochastic) (Col. 12 ll. 61-68)" Office Action at 2, the waveform described by Newhall appears to be completely random not one with a random variable or "stochastic", to those skilled in the art. Further, making "carrier signal independent data" or "digital watermark[s]" more unlikely to be discovered is the reason for introducing some random or stochastic properties to increase the difficulty at unauthorized erasure or determination of said data or watermark[s] by unauthorized parties. Newhall apparently teaches use of "random wave" for assisting with removing distortion and providing pre-distortion. Newhall still fails to meet the claim limitation of "preserving step comprises summarizing said identified **non-deterministic** components using stochastical methods" since focus is placed on deterministic components for filters that have an inverse. For these reasons, Claim 27 is patentable over

Newhall. Applicants' request that the Examiner withdraw the Section 102 rejection of Claim 27.

Claims 28, 30, 39 and 43 (and all claims depending therefrom)

Claims 28, 30, recite, among others, the step of using z-transform calculations to identify **non-deterministic** components of a digital sample stream. As discussed above in connection with Claim 21, Newhall does not disclose this limitation. In deed, Newhall teaches away from this step, and thus, Applicant requests that the 102 rejections of these claims be withdrawn.

Claims 33 (and all claims depending therefrom)

As discussed above, Newhall does not teach embedding carrier signal independent data, and for at least this reason the 102 rejection of Claim 33 should be withdrawn. Further, Newhall does not disclose a standard for "... measur[ing] a desirability of particular locations in a sample stream in which to encode carrier signal independent data ..." as required by Claim 33. In contrast, Applicants' provide support for "optimal locations" based on perception of the processed signal throughout the Specification. For this additional reason the 102 rejection should be withdrawn.

Rejections under 35 U.S.C. § 103

In order to "establish a prima facie case of obviousness, three basic criteria must be met." MPEP § 7.06.02(j). First, there must be some motivation or suggestion to modify the reference or to make the proposed combination. Second, there must be a reasonable expectation of success. "The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on the applicant's disclosure." MPEP § 2142 (citing In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). Third, the combined references must teach or suggest all claim limitations.

The Examiner has failed to establish a prima facie case of obviousness to the extent that there is no motivation or suggestion to make the proposed combinations of the references as directed by the Examiner. According to the MPEP, "[i]n order to support a conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention obvious in light of the teachings of the references."
MPEP 2142 (citing Ex parte Clapp, 277 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985)) (emphasis added). Further, "[w]hen the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the examiner to explain why the

combination of teachings is proper." MPEP 2142 (citing Ex Parte Skinner, 2 USPQ2d 1788 (Bd. Pat. App. & Inter. 1998)).

The Federal Circuit has recently emphasized the importance of providing evidence of motivation to combine in Winner Int'l Royalty Corp. v. Ching-Rong Wang, 202 F. 3d 1340, 1348-49 (Fed. Cir. Jan. 27, 2000). "Although a reference need not expressly teach that the disclosure contained therein should be combined with another . . . the showing of combinability, in whatever form, must nevertheless be 'clear and particular.'" Winner, 202 F. 3d at 1348-49 (citations omitted). Further, the "absence of such a suggestion to combine is dispositive in an obviousness determination." Gambro Lundia AB v. Baxter Healthcare Corp., 11 F.3d 1573, 1579 (Fed. Cir. 1997).

Applicant submits that the Examiner has not satisfied his initial burden of providing "clear and particular" evidence of motivation to combine for any of the proposed combinations of references. Instead, it appears that the Examiner has simply identified references that allegedly disclose the elements of the claim, and has combined them. Even assuming arguendo that the references contained all elements of the claimed invention, it is still impermissible to reject a claim as being obvious simply "by locating references which describe various aspects of a patent applicant's invention without also providing evidence of the motivating force which would impel one skilled in the art to do what the patent applicant has done." Ex parte Levengood, 28 USPQ2d 1300, 1303 (Bd. Pat. App. & Inter. 1993) (emphasis added).

1. a) § 103 Rejections Based on Newhall and Schneier

Claims 35-38 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Newhall further in view of Schneier. Examiner asserts that

> "... Newhall discloses a method for embedding recoverable sample data into an input signal wherein the input signal is modulated using composing functions (linear predictive coding) that include a Z-transform. Once the signal is run through composing functions data samples (carrier signal independent data, watermark) are embedded into the signal based on the results of the composing functions (Figs. 1A, 1B) (Col. 8, line 45 – Col. 9, line 6). Newhall does not disclose that the signal and sample information can be compressed. Schneier discloses that compression of data is well known in cryptosystems (page 226)"

Examiner's assertion is unsupported.

First, there is not motivation to combine Newhall with Schneier. Newhall teaches: "[a] system is described which achieves an increased rate of transmission by transmitting multiple symbols in one symbol time. The information in the overlapping symbols can be recovered if the symbol used for transmission is chosen so that a subset of the samples representing the symbol has an inverse" Newhall at Abstract. Newhall does not mention cryptosystems let alone steganographic systems such as digital watermarking. In fact,

Newhall in combination with Schneier teaches away from the Applicants' claimed invention. Schneier at page 226: "If the encryption algorithm is any good, the ciphertext will not be compressible; it will look like random data." Applicants' invention and claim limitations are not directed at traditional encryption and a logical result of combining Newhall with Schneier would be an encrypted stream of transmitted data, and thus "... it will look like random data" Schneier at 226. Neither Newhall nor Schneier disclose a means for steganographic encoding, or digital watermarking, as per the Applicants' Specification.

Second, even if there were a motivation to combine, the combination fails to disclose all of the elements of Claims 35-38 and the independent Claim 33, and dependent Claim 34. There are several reasons why the combination fails to relate to the Applicants' invention as described in the Specification and claim language include: 1) Newhall does not disclose a standard for "... measur[ing] a desirability of particular locations in a sample stream in which to encode carrier signal independent data ..." as required by Claim 33 from which Claims 35-38 depend. Applicants' provide support for "optimal locations" based on perception of the processed signal throughout the Specification; 2) Newhall does not disclose use of "non-deterministic" signal components, characteristics, or locations, for encoding "carrier signal independent data" to enhance security from "attacks" or unauthorized removal of the digital watermark[s] data; 3) Newhall teaches away from causing "signal degradation" or "encoding watermarks in a manner that they will not be removed by compression techniques which preserve a high degree of reproduction quality" at Applicants' Specification Col. 1-4, instead emphasizing standard transmission technology; 4) Newhall apparently is directed at improving communications bit rates-- not protection or security of signals, copyrighted or otherwise which may be fixed files or real time files--even IF Newhall's "embedded samples" could be construed as the Applicants' "carrier signal independent data"; and, 5) Newhall does not mention the term "compress" or "compression" within the context of the Specification or claim limitations, or even at all in the Newhall Specification, and neither does Schneier. Clearly, the combination cannot describe Applicant's invention if neither Newhall nor Schneier teaches "... using z-transforms to identify locations in said sample stream which would be desirable for encoding carrier signal independent data, wherein said locations are identified using at least one of the following characteristics of said sample stream: wave, amplitude, frequency, band energy, and phase energy" in accordance with Claim 33. Further the combination also fails to disclose "... encoding said carrier signal independent data into said identified locations of said sample stream to produce an embedded sample stream" as required by Claim 34, from which Claims 35-38 depend. Examiner's assertion that "signal and sample data of Newhall" could be compressed is simply unsupported and, thus, should be traversed.

Last, the combination of Newhall and Schneier also fails to disclose the limitations of the independent claims for the reasons discussed above in connection with the 102 rejections. The examiner relied upon Newhall as having disclosed certain limitations, and to the extent applicant has shown that those limitations are not present in Newhall, the examiner has failed to present a prima facie case of obviousness. For these indepent reasons, applicant request that the 103 rejections be withdrawn.

b) § 103 Rejections based on a judicially created doctrine of double-patenting.

Applicant is in the process of preparing a terminal disclaimer to respond to the double-patenting rejections. A

Conclusion

Applicant maintains that this application is in condition for allowance, and such disposition is earnestly solicited. If the Examiner believes that an interview with Applicant, either by telephone or in person, would further prosecution of this application, we would welcome the opportunity for such an interview.

Respectfully submitted,

Date: April 5, 2004